

U.S.S.N. 10/710,629

4

149461XT (GEMS 0248 PA)

In the claims:

1. (Currently Amended) An anode assembly comprising:
a thermally conductive bearing encasement covering at least a portion of at least one bearing; and
an anode rotating on said at least one bearing and having a target with an associated focal spot, which is displacement sensitive in response to expansion of said thermally conductive bearing encasement;
said thermally conductive bearing encasement configured and expansion limited to prevent displacement of said focal spot of greater than a predetermined displacement.
2. (Original) An assembly as in claim 1 wherein said thermally conductive bearing encasement comprises a thermally conductive stem.
3. (Currently Amended) An assembly as in claim 2 wherein said thermally conductive stem is formed of at least one control expansion alloy material selected from an alloy, ~~36 alloy, 39 alloy, 42 alloy, 45 alloy, 49 alloy, Invar 36® Alloy, Kovar® Alloy, Ceramvar® Alloy, and Inco 909.~~
4. (Original) An assembly as in claim 2 wherein said thermally conductive stem is formed of a combination of a plurality of materials selected from iron, nickel, and cobalt.
5. (Original) An assembly as in claim 1 wherein said thermally conductive bearing encasement comprises a thermally conductive housing.
6. (Currently Amended) An assembly as in claim 5 wherein said thermally conductive housing is formed of at least one control expansion alloy material selected from an alloy, ~~36 alloy, 39 alloy, 42 alloy, 45 alloy, 49 alloy, Invar 36® Alloy, Kovar® Alloy, Ceramvar® Alloy, and Inco 909.~~

U.S.S.N. 10/710,629

5

149461XT (GEMS 0248 PA)

7. (Original) An assembly as in claim 5 wherein said thermally conductive housing is formed of a combination of a plurality of materials selected from iron, nickel, and cobalt.

8. (Original) An assembly as in claim 1 further comprising a heat shield preventing thermal energy transfer between said anode and said bearings.

9. (Currently Amended) An assembly as in claim 8 wherein radial height of said heat shield is less than a predetermined height for thermal energy passage between said anode and said at least one bearing of greater than a predetermined threshold.

10. (Currently Amended) An assembly as in claim 8 wherein radial height of said heat shield is less than a predetermined height for temperature continuity between bearings of said at least one bearing.

11. (Original) An assembly as in claim 8 wherein said heat shield comprises at least one hole for the transfer of thermal energy.

12. (Currently Amended) An assembly as in claim 11 wherein said at least one hole are radially oriented to allow thermal energy transfer between said anode and said at least one bearing.

13. (Original) An assembly as in claim 8 wherein said thermally conductive bearing encasement and said heat shield maintain operating temperatures of said at least one bearing to be within a predetermined operating range.

14. (Original) An assembly as in claim 13 wherein said predetermined operating range is approximately 400°C to 550°C.

U.S.S.N. 10/710,629

6

149461XT (GEMS 0248 PA)

15. (Original) An assembly as in claim 1 wherein said thermally conductive bearing encasement prevents displacement of said focal spot in a forward direction along a longitudinal center axis of rotation of said anode.

16. (Currently Amended) An x-ray source comprising:
a cathode emitting electrons;
a thermally conductive bearing encasement comprising at least one alloy material and covering at least a portion of at least one bearing;
an anode rotating on and around said at least one bearing and having a target whereupon said electrons impinge to generate x-rays with an associated focal spot; and
a thermal shield residing axially between said thermally conductive bearing encasement and said anode along an axis of rotation;
said thermally conductive bearing encasement and said thermal shield configured and expansion limited to prevent displacement of said focal spot.

17. (Currently Amended) An x-ray source as in claim 16 wherein radial height of said heat shield is less than a predetermined height for temperature continuity between bearings of said at least one bearing.

18. (Original) An x-ray source as in claim 16 wherein said heat shield comprises at least one hole for the transfer of thermal energy.

19. (Currently Amended) An imaging system comprising:
an x-ray source comprising;
a cathode emitting electrons;
a thermally conductive bearing encasement comprising at least one alloy material and covering at least a portion of at least one bearing;

U.S.S.N. 10/710,629

7

149461XT (GEMS 0248 PA)

an anode rotating on and covering said at least one bearing and having a target whereupon said electrons impinge to generate x-rays with an associated focal spot; and

a thermal shield residing and extending longitudinally between said thermally conductive bearing encasement and said anode along an axis of rotation;

said thermally conductive bearing encasement and said thermal shield configured and expansion limited to prevent displacement of said focal spot of greater than approximately 700 μ m.

20. (Currently Amended) An imaging system as in claim 19 wherein said heat shield comprises at least one hole for the transfer of thermal energy and radial height of said heat shield is less than a predetermined height for temperature continuity between bearings of said at least one bearing.

21. (Original) A method of forming a thermally conductive bearing encasement for an anode assembly comprising:

determining a maximum focal spot displacement associated with target of the anode assembly;

determining a desired elastic modulus of at least one control alloy expansion material for the thermally conductive bearing encasement in response to said maximum focal spot displacement;

determining a desired thermal conductivity of said at least one control alloy expansion material;

determining said at least one control alloy expansion material in response to said elastic modulus and said thermal conductivity; and

forming the thermally conductive bearing encasement at least partially from said at least one control alloy expansion material.

U.S.S.N. 10/710,629

8

149461XT (GEMS 0248 PA)

22. (Original) A method as in claim 21 further comprising:
determining a desired level of rust for the thermally conductive bearing encasement; and
determining said at least one control alloy expansion material in response to said level of rust.

23. (Original) A method as in claim 21 further comprising:
determining an anode bearing temperature operating range; and
determining said at least one control alloy expansion material in response to said anode bearing temperature operating range.